Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2013

CIVIL TECHNOLOGY MEMORANDUM

MARKS: 200

This memorandum of 8 pages.

QUESTION 1: CONSTRUCTION PROCESSES

1.1
- Wear safety goggles.
- Hold machine firm with both hands.
- Remove the chuck key from chuck before switching on the drill.
- Keep the power cord away from sharp edges.
- Small pieces to be drilled must be clamped in a vice.
- The machine must stop before it is put down. (Any 4 x 1) (4)

1.2
- Half lapped joint (1)

1.3 Scaffolding

1.3.1 Scaffolding are temporary frameworks which are constructed to support material and workmen working high above the ground. (2)

1.3.2 Pipe scaffolds and trestles (2)

1.3.3 Base plate (1)

1.3.4
- Must be constructed on level ground.
- Must be rigid.
- Protruding ends must be covered.
- Must not be overloaded.
- Materials must be placed so that workers can move freely.
- Must be connected to the building.
- Clamps and couplers must be rigid.
- Pipes must be in good condition.
- Must be constructed upright.
- May not move with workers still on it.
- No unauthorised persons are allowed on scaffolds. (Any 5 x 1) (5)

1.4 Roof screws, hook-bolt and nut (2)

1.5
- Keep trusses vertically in position.
- Ensure that the top and bottom parts of rafters stay straight.
- Keep spacing constant.
- Ensure that sections taking pressure will not bend. (4 x 1) (4)

1.6
- Place pressure on wound to stop bleeding and apply pressure bandage.
- Lift the limb higher than the body and keep the body warm. (2 x 1) (2)

1.7
- Coal tar creosotes
- Aqueous solutions of metallic salts
- Solutions in volatile organic solvents (3)

1.8
- Heat
- Oxygen
- Fuel (3)

1.9 CO_2 - or dry chemical fire extinguisher (1)

[30]

QUESTION 2: ADVANCED CONSTRUCTION PROCESSES

2.1 Piled foundation (Piling) is a concrete column that forms the deepest part of a foundation and help to distribute the weight of the building onto firmer ground. (2)

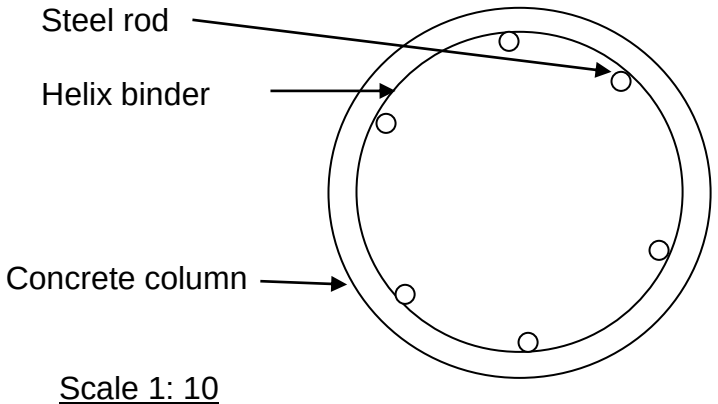
2.2 At unstable ground where the ground is not firm enough to support the weight of the building. (1)

2.3
- It is cheaper than solid floors
- Excellent constructional integrity
- Easy and time saving
- No skilled labour required
- Improved sound and temperature insulation
- Minimal boxing required
- Quality plastered architrave with no joints
- Less concrete required (Any 4 x 1) (4)

2.4
- Concrete blocks (hollow blocks)
- Rib (precast concrete beam)
- Steel reinforcement
- Wet concrete (Any 3 x 1) (3)

2.5
- Weld
- Rivets
- Bolt and nut (3)

2.6 Round concrete column



Labels – 4
Accuracy – 6

Scale 1: 10

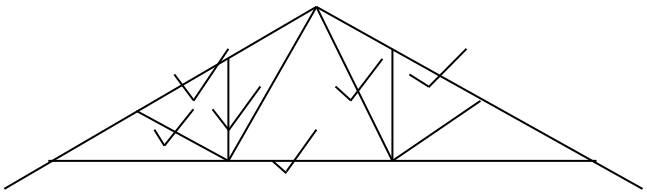
(10)

2.7 Height and distance from dumpy level to the object. (2)

2.8 Slump test and cube test (2)

2.9 Mass concrete is used at firm soil for single story buildings without reinforcement √√ and reinforced concrete is reinforced with steel rods. √√ (4)

2.10 Fan type roof truss



(6)

2.11
- Plunge pumps can be installed.
- Gutters at roofs with downpipes to channel water away from building.
- Place plastic membrane on outside of wall and under floor.
- Drainage channels to take water away. (3)

[40]

QUESTION 3: CIVIL SERVICES

3.1 (Missing word)

3.1.1 thermostat

3.1.2 manhole

3.1.3 grease trap

3.1.4 ball valve

3.1.5 red (5 x 1) (5)

3.2 From the distribution board the power is distributed to the service points in the house. (1)

3.3
- The PVC-pipes are light in weight.
- Get in long lengths
- Less joints needed.
- Easy to install.
- Good flow efficiency.
- Resistant to most chemicals.
- Tight joints possible. (Any 5 x 1) (5)

3.4 Water from reservoirs of local authorities are divided into main supply pipes √ and distribution pipes √ to where it is needed. Municipal distribution lines runs underground √ alongside the residential site to a service point where a municipal stop cock √ and water meter √ are situated. From the water meter the service pipe √ runs to the house. (5)

3.5 Radioactive material is used to heat water to produce steam which turns turbines to generate electricity. (2)

3.6
- Clean energy / no waste products.
- Relatively maintenance-free. (2)

3.7
- Solar panels must face north.
- Must be tilted at a 35 degree angle.
- Must be SABS approved.
- Panels must not be in the shade.
- Circulation pipes must be insulated to avoid heat loss. (Any 4 x 1) (4)

3.8 A rodding eye is installed to give easy access to drain pipes.
Advantage: Cleaning rods can be pushed through to clean or unblock drains. (2)

3.9 3.9.1 B (1)

3.9.2 MH (1)

3.9.3 G (1)

3.9.4 VP (1)

[30]

QUESTION 4: MATERIALS AND QUANTITIES

4.1 Thermo plastics – Can be heated to change shape.
Thermo-hardened plastics – Hard and brittle and cannot be heated to change shape. (4)

4.2 Pattern glass / stained glass (1)

4.3 4.3.1 D (1)

4.3.2 E (1)

4.3.3 B (1)

4.3.4 A (1)

4.3.5 C (1)

4.4 List of quantities. Roof truss (All wood 114 mm wide and 38 mm thick)

Description	**Amount needed**	**Length**	**Subtotals lengths needed**
A – Rafter	16 ✓	6 500 mm	104 000 mm ✓
B – Tie beam	8 ✓	4 400 mm	35 200 mm ✓
C – King post	8 ✓	2 100 mm	16 800 mm ✓
D – Strut	16 ✓	1 800 mm	28 800 mm ✓
E – Hanger	16 ✓	1 500 mm	24 000 mm ✓
Total length needed for eight trusses			208 800 mm ✓✓

(12)

4.5
- Prevent wood from rotting.
- Prevent termites and worms from weakening wood.
- Ensure long life-span of wood. (3 x 1) (3)

4.6 Water activates a chemical reaction with cement for the hardening of the materials to take place. It helps to mix the ingredients. (2)

4.7
- Eating utensils
- Electrical conductors
- Window frames (3 x 1) (3)

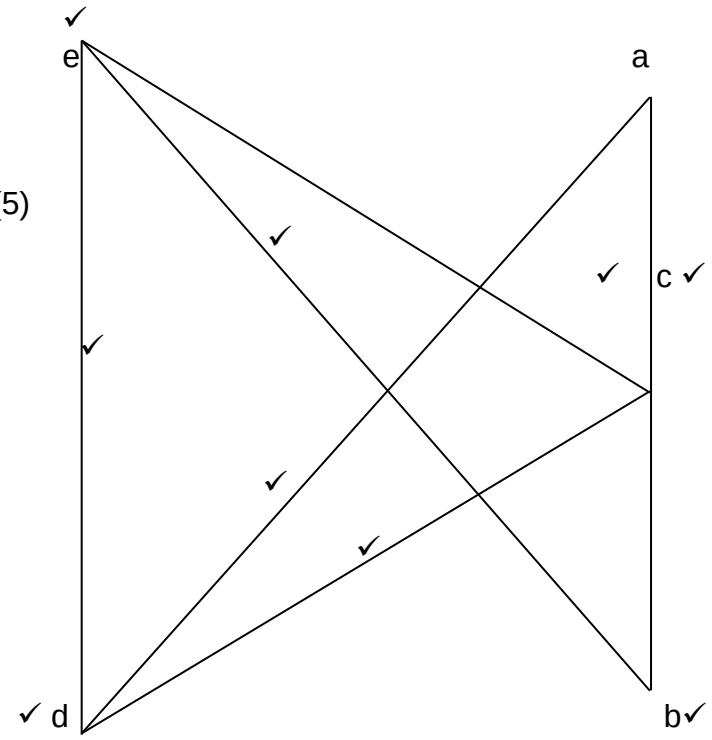
[30]

QUESTION 5: APPLIED MECHANICS

5.1 Forces diagram.

Part	Force
AD	130 N ✓
BE	130 N ✓
CE	106 N ✓
CD	106 N ✓
DE	104 N ✓

(5)



(9) (14)

5.2

around A	around B
ML = MR	MR = ML
(B x 8 m) = (100 N x 2)+(80 N x 6 m) ✓	(A x 8 m) = (80 N x 2 m)+(100 N x 6 m) ✓
B8 N/m = 200 N/m + 480 N/m✓	A8 N/m = 160 N/m + 600 N/ m✓
B = 680 N/m / 8 m ✓	A = 760 N/m / 8 m ✓
B = 85 N ✓	A = 95 N✓

(8)

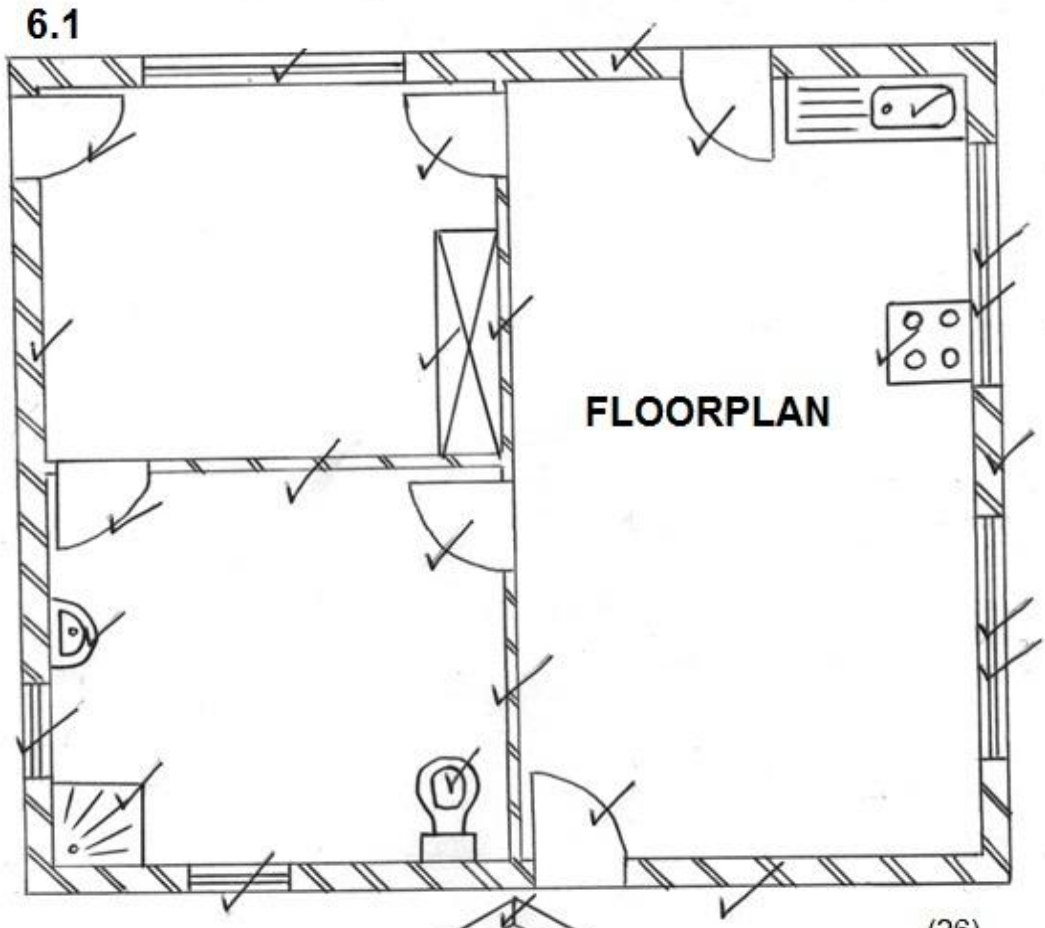
5.3 Shear force values

A = -30 N ✓
B = -30 N + 100 N = 70 N ✓✓
C = 70 N – 80 N = -10 N ✓✓
D = -10 N – 20 N = -30 N ✓✓
E = -30 N + 30 N = 0 N ✓ (8)

[30]

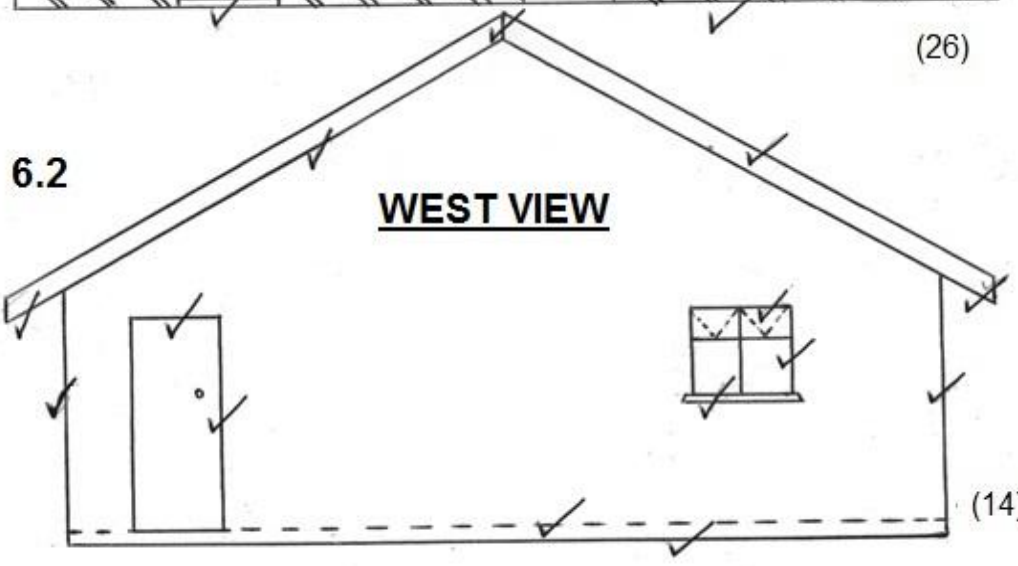
QUESTION 6

6.1



(26)

6.2



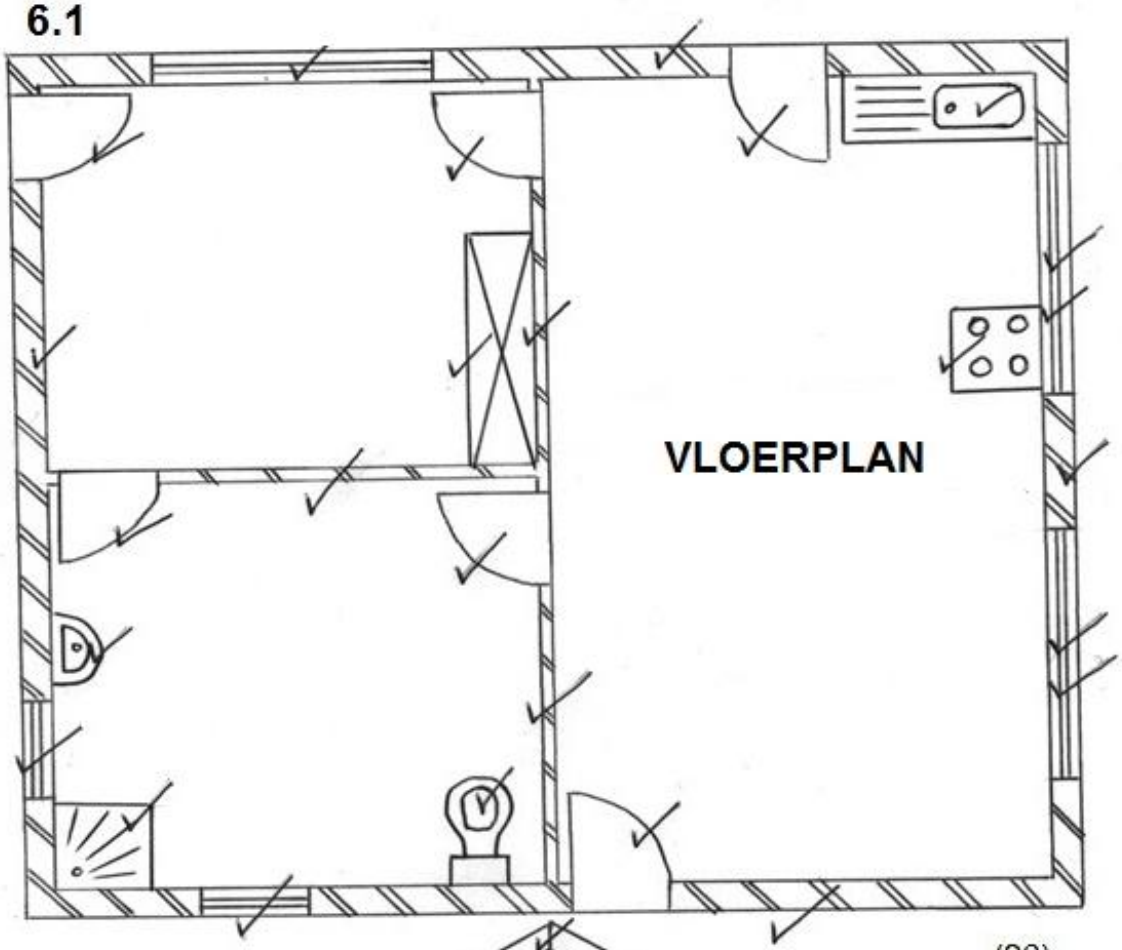
(14)

(40)

TOTAL: 200

VRAAG 6

6.1



(26)

6.2

(14)

(40)

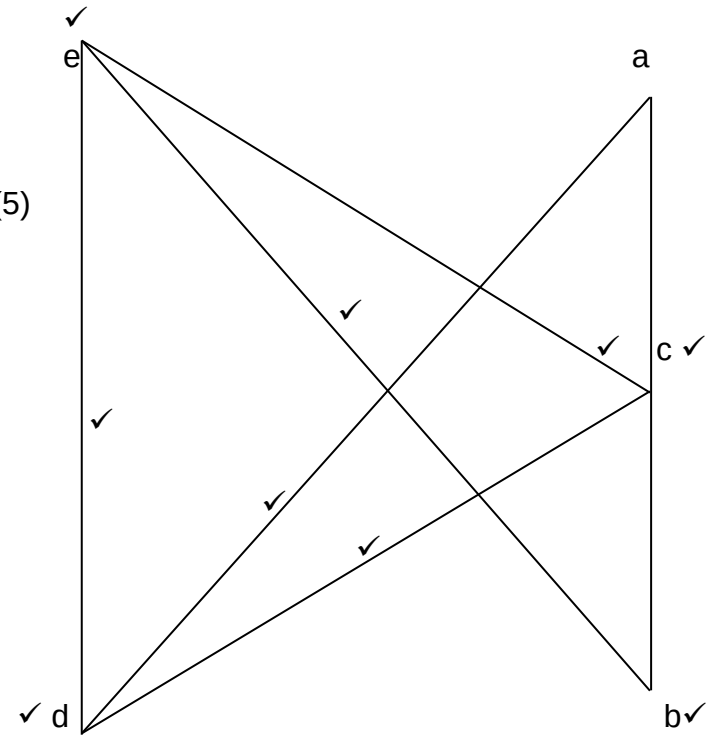
TOTAAL: 200

VRAAG 5: TOEGEPASTE MEGANIKA

5.1 Kragtediagram.

Deel	Krag
AD	130 N ✓
BE	130 N ✓
CE	106 N ✓
CD	106 N ✓
DE	104 N ✓

(5)



(9) (14)

5.2

Om A	Om B
LOM = ROM	LOM = ROM
(B x 8 m) = (100 N x 2)+(80 N x 6 m) ✓	(A x 8 m) = (80 N x 2 m)+(100 N x 6 m) ✓
B8 N/m = 200 N/m + 480 N/m✓	A8 N/m = 160 N/m + 600 N/ m✓
B = 680 N/m / 8 m ✓	A = 760 N/m ✓ / 8 m
B = 85 N ✓	A = 95 N✓

(8)

5.3 Skuifkragte waardes

A = -30 N ✓
B = -30 N + 100 N = 70 N ✓✓
C = 70 N – 80 N = -10 N ✓✓
D = -10 N – 20 N = -30 N ✓✓
E = -30 N + 30 N = 0 N ✓ (8)

[30]

4.4 Hoeveelheidslys. Dakkap. (Alle hout 114 mm wyd x 38 mm dik)

Beskrywing	**Hoeveelheid benodig**	**Lengte**	**Subtotale lengte benodig**
A – Dakspar	16 ✓	6 500 mm	104 000 mm ✓
B – Bintbalk	8 ✓	4 400 mm	35 200 mm ✓
C – Hoofstyl	8 ✓	2 100 mm	16 800 mm ✓
D – Stut	16 ✓	1 800 mm	28 800 mm ✓
E – Hanger	16 ✓	1 500 mm	24 000 mm ✓
Totale lengte benodig vir agt dakkappe			208 800 mm ✓✓

(12)

4.5
- Verhoed dat hout vrot.
- Verhoed dat kewers of wurms die hout verswak.
- Verseker dat hout ’n lang lewensduur het. (3 x 1) (3)

4.6 Water vorm ’n chemiese reaksie met sement wat ’n harde, sterk massa vorm waarin die sand en klip gebind is en maak mengsel meer bewerkbaar. (2)

4.7
- Kookgerei
- Elektrisiteitsgeleiers
- Vensters (3 x 1) (3)

[30]

3.4 Water word vanaf die reservoirs van die plaaslike owerheid verdeel in hoofleidings √ en verdeelleidings √ na die gebiede waar dit benodig word. Munisipale verdeelleidings loop ondergronds √ langs woonerf tot by dienspunt waar die munisipale afsluitkraan √ en watermeter √ is. Vanaf die watermeter loop die verbruikerspyp √ na die huis. (5)

3.5 Radioaktiewe materiaal word gebruik om water in stoom te verander wat turbines aandryf om elektrisiteit op te wek. (2)

3.6
- Skoon energie / geen afvalstowwe.
- Verg relatief min onderhoud. (2)

3.7
- Sonpanele moet noord wys.
- Moet teen 'n helling van 35 grade opgerig word.
- Moet SABS goedgekeur wees.
- Panele moet so geplaas word dat dit nie in skaduwee is nie.
- Sirkulasie-pype moet geïsoleer word om verlies van hitte te voorkom.

(Enige 4 x 1) (4)

3.8 'n Inspeksie-oog word geïnstalleer om maklik te sien as daar 'n blokkasie is. Voordeel: As blokkasies skoongemaak word deur skoonmaaktoerusting in te steek. (2)

3.9 3.9.1 B (1)

3.9.2 MG (1)

3.9.3 RP (1)

3.9.4 VP (1)

[30]

VRAAG 4: MATERIALE EN HOEVEELHEDE

4.1 Termoplastiek – Kan verhit word om in verskillende vorms te buig.
Termoverharde plastiek – Hard en breekbaar, kan nie weer verhit word om vorm te verander nie. (4)

4.2 Vertroebelde glas / patroonglas (1)

4.3 4.3.1 D (1)

4.3.2 E (1)

4.3.3 B (1)

4.3.4 A (1)

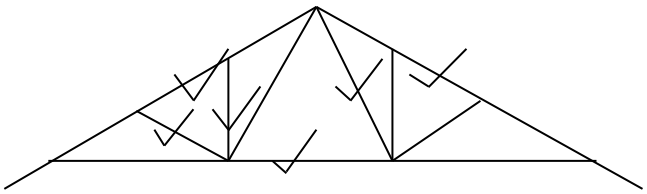
4.3.5 C (1)

2.7 Hoogte en afstand vanaf bukswaterpas tot by die voorwerp. (2)

2.8 Saktoets en kubustoets (2)

2.9 Massabeton word net so gebruik sonder versterking √√ en gewapende beton word met staalstawe versterk. √√ (4)

2.10 Waaiertipe dakkap



(6)

2.11
- Dompelpompe kan installeer word.
- Geute met afvoerpype wat water vanaf gebou weglei.
- Plaas plastiekmembraan aan buitekant van muur en onder vloer.
- Dreineerkanale om water weg te lei. (3)

[40]

VRAAG 3: SIVIELE DIENSTE

3.1 (Ontbrekende woord)

3.1.1 termostaat

3.1.2 mangat

3.1.3 vetvanger

3.1.4 vlotterklep

3.1.5 rooi (5 x 1) (5)

3.2 Vanaf die verdeelbord word die krag verdeel na die verskillende verbruikerspunte. (1)

3.3
- PVC-pype is lig in massa.
- Kry in lang lengtes.
- Minder laswerk nodig.
- Maklik om te installeer.
- Goeie vloeidoeltreffendheid.
- Bied weerstand teen chemiese stowwe.
- Digte lasse moontlik. (Enige 5 x 1) (5)

1.8
- Hitte
- Suurstof
- Brandstof (3)

1.9 CO_2 - of droë chemikalieë brandblusser (1)

[30]

VRAAG 2: GEVORDERDE KONSTRUKSIEPROSESSE

2.1 Heipale is 'n betonkolom wat dien as onderdeel van 'n fondasie wat help om die gewig van die gebou na meer stabiele grond oor te dra. (2)

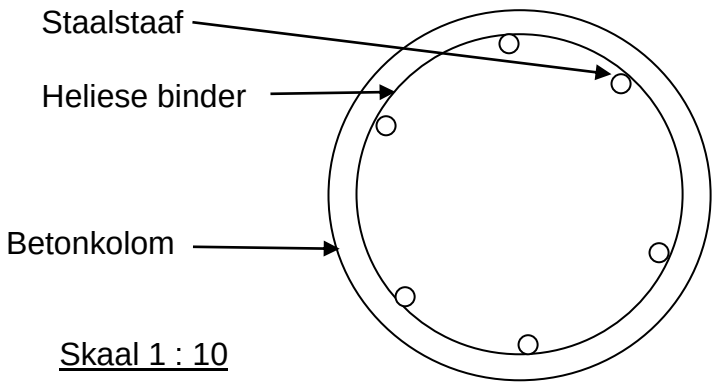
2.2 By onstabiele grond waar dit nie die gewig van die gebou kan dra nie. (1)

2.3
- Dit is goedkoper as soliede vloere
- Het uitstekende strukturele integriteit
- Maklik om op te rig en tydbesparend
- Geen geskoolde arbeid benodig
- Beter klank-en hitte-isolasie
- Min bekisting benodig
- Kwaliteit gepleisterde soffiet met geen lasse
- Minder beton benodig (Enige 4 x 1) (4)

2.4
- Betonblokke
- Rib (betonbalk)
- Staalmat versterking
- Nat beton (Enige 3 x 1) (3)

2.5
- Sweis
- Klinknaels
- Bout en moer (3)

2.6 Ronde betonkolom



Byskrifte – 4
Akkuraatheid – 6

(10)

VRAAG 1: KONSTRUKSIEPROSESSE

1.1
- Dra 'n beskermingsbril.
- Hou masjien stewig met twee hande vas.
- Verwyder die klembussleutel voordat jy die masjien aanskakel.
- Hou die koord weg van skerp hoeke.
- Klein voorwerpe wat geboor word moet vasgeklamp wees.
- Wag tot die boor stop voordat jy die boor neersit. (Enige 4 x 1) (4)

1.2
- Half-inlaatvoeg (1)

1.3 Steierwerk

1.3.1 Steierwerk is tydelike pypstellasies wat opgerig word om materiaal en werkers te ondersteun wat op hoë vlakke moet werk. (2)

1.3.2 Steierbokke en pypsteiers (2)

1.3.3 Basisplaat (1)

1.3.4
- Moet op 'n gelyk oppervlakte staan.
- Moet stewig wees en onbuigbaar wees.
- Uitstaande hoeke moet beskut wees.
- Moet nie oorlaai word nie.
- Plaas materiaal so dat werkers vryelik kan beweeg.
- Moet aan gebou vasgemaak wees.
- Koppelings moet stewig wees.
- Pype moet in goeie toestand wees.
- Moet regop opgerig word.
- Mag nie verskuif met werkers op steiers nie.
- Geen ongemagtigde persone op steiers mag toegelaat word nie. . (Enige 5 x 1) (5)

1.4 Dakskroewe, haakbout en moer (2)

1.5
- Hou kappe vertikaal as dit opgestel is.
- Verseker dat boonste en onderste dele van daksparre reguit bly.
- Hou kapspasiëring konstant.
- Verseker dat drukdele nie buig nie. (4 x 1) (4)

1.6
- Plaas volgehoue druk met verband op wond en verbind met drukverband.
- Lig die ledemaat hoër as hart van persoon en hou persoon warm. (2 x 1) (2)

1.7
- Koolteer kreosote
- Wateroplossings met metaalsoute
- Oplossings in organiese oplosmiddels (3)

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